

Hobbies

WEEKLY

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A TEA TROLLEY FOR THE GARDEN

A DINING-ROOM service wagon can be made into quite a beautiful piece of furniture, but this is not possible with the tea trolley designed solely for garden use. An elegant finish, small rubber castors, and so on, would be sadly out of place at the picnic tea.

This is not to say that a garden trolley can be made in a slipshod manner from any odds and ends of material. The more familiar design must be modified to suit the new requirements, but the underlying principles of the design must be sound.

For the wagon described below it is suggested that ash, beech or elm be used. The timber must be of reasonably good quality without too high a percentage of knots, for the work is neither stained nor painted. This is not intended as an economy measure, but a natural wood finish is more in keeping with the design, and none of the untreated woods mentioned will come to any great harm if they are left exposed to the weather for a few days.

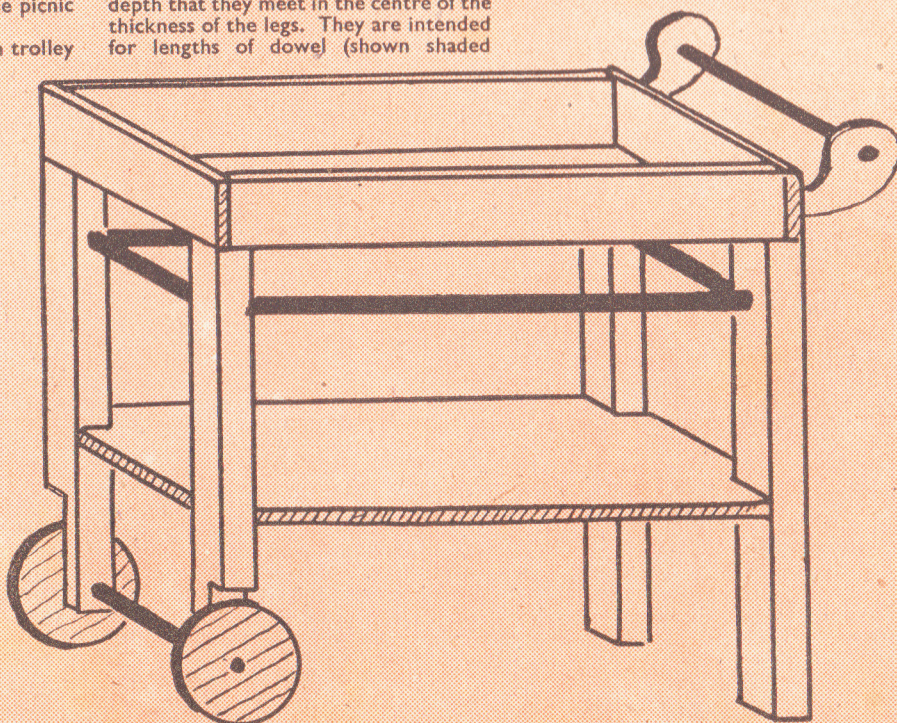
The four legs are of $1\frac{1}{2}$ ins. square material, the two back legs being 2ft. and the front legs 1ft. $10\frac{1}{2}$ ins. long. In what is to be the outside edge of each front leg a slot $4\frac{1}{2}$ ins. long by $\frac{1}{2}$ in. deep is taken out with the tenon saw, while on two

adjacent faces of each leg a $\frac{1}{2}$ in. diameter hole is bored. These holes have their centres at 2 ins. from the top of the leg. Before drilling the holes the legs should be arranged in pairs to ensure that they are drilled on the proper faces.

These holes must be drilled to such a depth that they meet in the centre of the thickness of the legs. They are intended for lengths of dowel (shown shaded

black on the perspective sketch) that 'tie' the parts of the framework together.

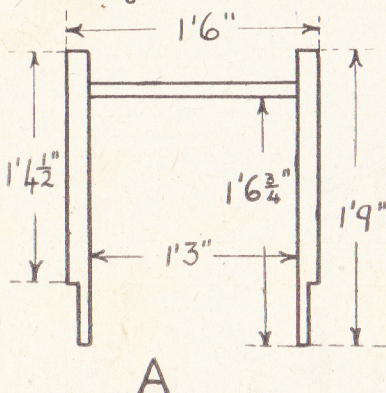
Two narrow frameworks are made by gluing a 1ft. 5 ins. length of $\frac{1}{2}$ in. diameter dowel between the holes on the front and back pairs of legs. Before being glued into place the end of each dowel



All correspondence should be addressed to The Editor, Hobbies Weekly, Dereham, Norfolk.

must be cut across at an angle to 45 degrees, so that the long side dowels, when similarly treated, will be able to fit correctly into the leg. Drawing (A) shows the front pair of legs at this stage.

When the glue on these two frameworks has dried the long side dowels (2ft. 5ins. long) can be glued into place. At this stage the framework will not be



particularly strong, and to prevent it sagging, the front legs should be, temporarily, supported on 3ins. thick blocks.

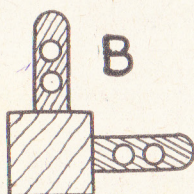
Bottom Shelf

The next step is to fix the bottom shelf. This measures 27ins. by 15ins., and may be of $\frac{1}{2}$ in. plywood or $\frac{1}{2}$ in. solid timber; in the latter case boards will need to be glue-jointed together to obtain the required width. A rectangle $1\frac{1}{2}$ ins. square is cut from each corner so that it can be housed round the legs, and it is fixed into place so that its lower edge is at 9ins. from the bottom of the back legs.

Special fittings are available to simplify the fixing. Each fitting has two screw-holes bored in a thin metal plate,

the end of which carries a screw-thread. One such fitting is screwed in to each of the two inside faces of each leg, then screws are driven up through the holes in the plate into the under-side of the shelf. A plan of this arrangement is given at (B).

Wood of $\frac{1}{2}$ in. thickness is used for the top tray. The sides of this are 3ins. deep and they are assembled with ordinary screwed butt joints to make a framework measuring 27ins. by 15ins. These joints, and all screwed work in the construction, should be fastened with flat-head brass screws, countersunk so that they are flush with the surface of the wood.



Three 1in. wide by $\frac{1}{2}$ in. thick strips are then screwed between the long sides of the framework, level with the bottom edge. Two of these strips butt against the inside edge of the long sides, while the third is midway between them. The tray is then fastened on top of the legs, using a 2in. screw at each corner.

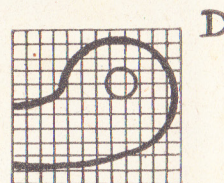
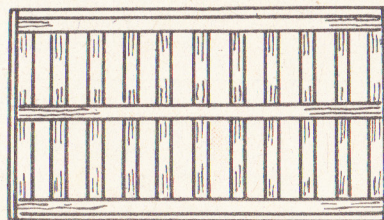
Eleven short strips of 1in. by $\frac{1}{2}$ in. are then screwed down on top of the longitudinal strips on the inside of the tray, these being spaced at equal distances apart. Drawing (C) gives a plan of the completed top tray as viewed from beneath.

Handle

The handle is the next item to be fixed. End brackets for this are cut from

$\frac{1}{2}$ in. thick wood to the shape shown at drawing (D). This drawing has been covered with a gridded framework to make the outline easy to follow, each small square of the grid having sides that must be assumed to be $\frac{1}{4}$ in. long. At the position indicated, a $\frac{1}{2}$ in. diameter hole is drilled in each bracket, and a 1ft. length of dowelling is glued between these. The assembled fitting is then screwed to the back rail of the top tray, being set in the centre of the length of it.

The wheels are simply circles of $\frac{1}{2}$ in. thick wood, and are 5ins. in diameter. A $\frac{1}{2}$ in. diameter hole is bored through



the centre of each, while similar holes are bored in the half-thicknesses of the front legs, the centres for these holes being at 1in. from the bottom of the tongue.

Axles

Dowelling is used for the axle, but it should be slightly eased with coarse glasspaper at the points where it passes through the holes. The axle should have an overall length of 1ft. 9 $\frac{1}{2}$ ins. Its end is glued into one of the wheels (flush with its outer surface), it is threaded through the holes, and the second wheel is then glued into place. The glue should be given a good chance to set before the wheels are tried out. Apart from a thorough glasspapering, this completes the work on the trolley. (375)

Making Microscopic Slides

FOR the amateur naturalist there are few more fascinating branches of his craft than microscopic work. Even if one is not the possessor of a microscope there are now a number of cheaper instruments available which serve almost the same purpose at a far less expensive outlay.

The making of slides, with the infinite variety, saves extra expense, while at the same time being interesting and satisfying. They are simply made, and at little cost.

The Slides

The slides themselves can be bought or cut from plate glass or from old negative camera plates from which the negative is removed by washing in hot soda and water. They should measure 3ins. by 1 $\frac{1}{2}$ in.; this is the size of normal slides.

Besides these there will also be required a solution of balsam and chloroform, small glass setting rings, a

small earthenware tile, and brunswick black varnish.

Little is needed in the way of instruments, but some pointed steel knitting needles will be useful for setting some of the subjects; and also a small pair of forceps, clean razor blades, test tubes, and watch glasses. Some subjects will require to be dyed, and for this violet methyl is generally used.

Mounting the Subjects

More opaque subjects require to be soaked in turpentine for a few days to make them more transparent. Those which can be mounted dry are dealt with thus. In the centre of the slide let fall a drop of balsam, and work this to a small circle of the liquid. Place the slide on the earthenware tile which has already been slightly warmed.

Make a ring of the varnish round the balsam, and the heat will soften this in readiness for the setting ring to be put in place. When this is placed over the subject, which is put carefully in position

in the spot of balsam, press it gently and firmly so that all the air is excluded at the same time. The plate may then be allowed to cool.

Opaque Subjects

Soak these for a few days in turpentine, then wash in clean water. If they require to be dyed, place them for a minute or two in the methyl. Place the balsam on the slide, put the subject in position, press on the setting slip, and varnish it into position round the edge.

When dealing with moist subjects, such as the part of a small insect, the whole can be soaked for a few days in liquor potasse, and the part desired can then be worked away and washed in clean water. Dry them on blotting paper, and they can then be mounted as explained before.

Variety of Slides

The field from which subjects can be chosen is almost without limit. Sections

(Continued foot of page 371)

How the handyman can easily undertake SIMPLE HOME REPAIRS

IN these days of rising prices, the ordinary man is compelled to economise as best he can. One way of saving money is to do your own household repairs. The only tools necessary are those the handyman already has in his possession, a pair of pliers, wrench, screwdriver and file. Here are a few simple hints on how to undertake some of these minor jobs about the home.

A Dripping Tap

If the tap drips continuously, it follows that the rubber washer in the tap has worn out and requires to be renewed. To fix a new washer in the tap, first unscrew the cover (see Fig. 1) to reveal nut (A), which should be turned anti-clockwise until the top of the tap is disconnected from the bottom half. All that remains to be done is to unscrew the lock nut which secures the old washer, take

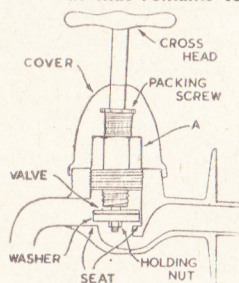


Fig. 1—Tap section

off the old washer, and put on the new one, purchasable in any ironmonger's or plumber's shop. Finally, screw on the lock nut, and assemble the tap.

Fitting a New Tap

Perhaps you may wish to fit a new tap. The procedure is quite easy. Turn off the water, unscrew the two screws holding the old tap to the pipe board, and then turn the whole tap anti-clockwise until it is disconnected from the pipe.

A short threaded piece of pipe will be seen sticking out from the back of the new tap. This piece must be screwed into the water pipe connection, but before this is done, give the threads a coating of paint to ensure watertightness. After screwing the tap to the water pipe connection, use chromium

screws to fix the new tap to the pipe board.

The Overflowing Cistern

Another common domestic problem is the overflowing lavatory cistern, or it may be the cold water storage tank. Both cistern and storage tank are fed through a ball-cock. Fig. 2 shows how, by means of the ball-cock, the flow of water is automatically shut off when the cistern or tank is full. As the level of the water rises, the floating copper ball moves upward, and the lever slides the cartridge along until the rubber washer presses against the face of the ball-cock, and so stops the inflow of water.

Like a tap washer, the ball-cock washer eventually wears out, and fails to shut off all the water, and so the water rises to the overflow pipe, and runs over outside. The rubber washer can be renewed just as easily as the tap washer. First, give the stop-cock and the ball-cock a quarter turn so that the stop-cock is lying at right angles to the pipe. The water can no longer flow through the

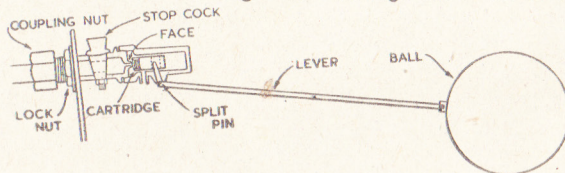


Fig. 2—A cistern ball valve

ball-cock. Take out the split pin to enable the lever to be withdrawn.

It will be seen from the diagram that the 'shell', containing the cartridge, is screwed to the part of the ball-cock, made up of the stop-cock and the face. Unscrew the 'shell', and take out the cartridge. Fig. 3 shows how the cartridge is constructed. Unscrew the part of the cartridge, marked (A) in the diagram, and take out the old washer. A new washer must now be made.

Obtain a piece of rubber $\frac{1}{16}$ in. thick. (A piece of old rubber mat will do, or if this is not available, a plumber can be asked for some sheet rubber). Cut it to the same size as the bore of part (A) press it into the open end of that part. Screw the two parts of the cartridge together.

Before assembling the ball-cock, you should file the face a little to ensure a good contact between the face and the washer.

File the outside of the cartridge and the split pin in order to cut down friction and prevent sticking.

Assemble the ball-cock, making sure that the short lever arm is in the slit in the cartridge. Turn on the stop-cock. If the water still rises up to the overflow pipe, bend the lever arm slightly downwards to lower the ball.

Sometimes the copper ball develops a leak, because of water corrosion, and fails to float. When this happens, turn off the water. Unscrew the ball from the lever (see Fig. 2). Buy a new ball of the same size from a plumber. Screw on the new ball, and turn on the water.

A Choked Sink

It needs no mechanical skill to clear a choked sink. Unscrew the small trap screw, underneath the U-shaped bend in the waste pipe, remembering, of course, before unscrewing, to put a pail under-

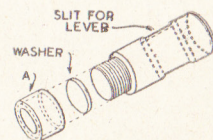


Fig. 3 Washer details

neath the bend to catch the water from the sink.

Make a small hook on the end of a long piece of wire. Poke the wire through the hole from which the trap screw has been removed. Push the wire in both directions, and give it a twist now and again in an attempt to hook the obstruction.

If the sink is still choked after the trap screw is replaced, bore a hole in the waste pipe just before it enters the outside wall. Through this hole, poke the wire in both directions, again giving the wire an occasional twist. The obstruction, usually a number of small pieces of cloth, will be hooked on the end of the wire, and taken out. After the sink is cleared, plug the hole up with a piece of wood. (383)

Microscopic Slides—(Continued from page 370)

of twigs and stems can be sliced quite easily with a razor blade, and have a wide variety of patterns through them. A multitude of creatures found in every garden provide many, many subjects: the earthworm, the common fly, spiders, ants, beetles, wasps and bees, larvae. The legs, tongues, antennae, eye, stomach, palate, and other parts are all very suitable for mounting.

In the case of creatures with a hard shell or outer covering, work the inner parts away before mounting if the whole

is being dealt with. The eggs of various creatures are very beautiful, and the cast-off skin of some creatures makes an excellent mount. Hairs from the bodies of insects are very fine, and also the wings of flying creatures.

Vegetables and Creatures

Portions can be cut from all the common household vegetables for mounting, as well as from the fruits of wild plants and trees. Sections can also be shaved from the roots of plants.

Sections of the seeds of plants are easily shaved, and make particularly good specimens.

Only a few of the more common subjects have been mentioned here, but it will be seen that the variety is endless. It is not until this interesting and simple branch of the naturalist's art has been tried that it is realised what a world of beauty lies hidden from the ordinary eye, a beauty which can only be seen on the microscope slide. (365)

A novel and practical article is this small REVOLVING CABINET

THIS novelty cabinet with a rotating or turntable shelf was produced originally to hold four bottles of ink. Each bottle was of a different colour and the selector knob on top coloured accordingly. Rotating this knob brought that ink bottle to the front of the cabinet for easy removal.

Obviously this little cabinet has numerous other applications as a dispenser—either for the table to house the

into a piece of tin which is turned over, as shown, and pressed into the base wood. The top of the dowel projects through a $\frac{1}{4}$ in. diameter hole in the top of the cabinet and is then capped with a small hardwood disc or button.

Dowel, discs and button are assembled as an integral unit and glued together, remembering that the knob can only be added after the main assembly is located within the cabinet. The cabinet, in fact, will have to be built

centre of the base. The corner joints of the side can be backed up with triangular stock, if desired, glued in place. These should be cut to exactly 3 ins. length, three being required. These will be quite hidden and are not shown in the drawings.

Rotating Shelf

At this stage the rotating shelf assembly should be added, when the top can be slid into place. Glue and pin or

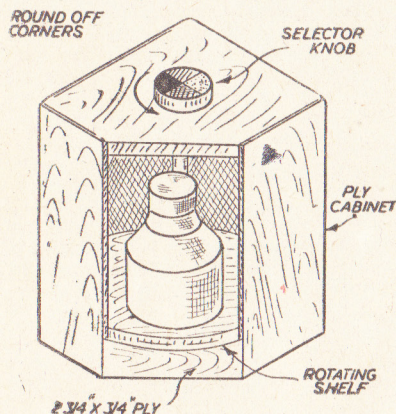


Fig. 1—General view

condiment set, in the office or study for inks or paints, or even in the workshop. The one described takes four small sized ink bottles which have a base diameter of slightly less than $1\frac{1}{2}$ ins. For other containers or bottles the dimensions can be altered accordingly.

The rotating shelf is made from two pieces of ply, cut to circular outline—Fig. 2. One disc is again fretted out with four circular holes, each $1\frac{1}{2}$ ins. diameter. When the discs are glued together these holes form a well to hold the ink bottles in place. A $\frac{1}{4}$ in. diameter hole is drilled through the centre of each disc to take the dowel spindle.

Assembly

The rotating shelf assembly is shown in Fig. 5. The $3\frac{3}{4}$ in. length of $\frac{1}{4}$ in. dowel fits flush with the bottom of the assembled discs. This dowel is drilled out to take a gramophone needle which is a force fit. Assembled in the cabinet, this needle point rests in a 'dimple' punched

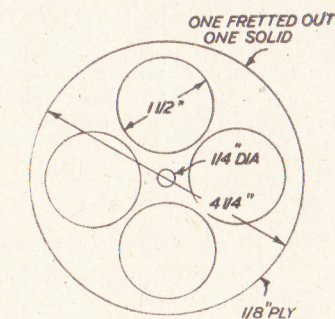


Fig. 2—The circle shelf

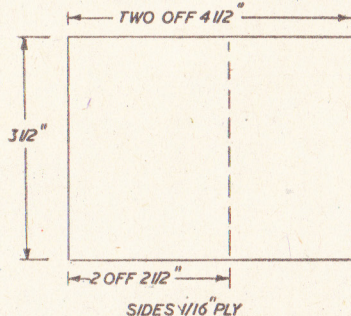


Fig. 4—The sides

up around this main assembly.

The cabinet top and bottom are cut from $\frac{1}{4}$ in. ply to the dimensions shown. Only the top is drilled out with a $\frac{1}{4}$ in. diameter hole at the centre of one diagonal.

The sides are cut from $\frac{1}{16}$ in. ply, two wide and two narrow. All the sides are $3\frac{1}{2}$ ins. high. Assemble the four sides on the base, gluing and pinning or bradding. Add also the tinplate bearing at the

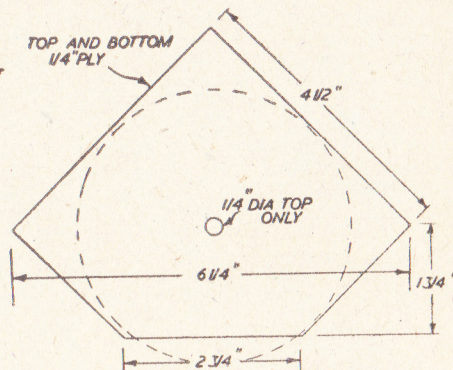


Fig. 3—Plan of base and top

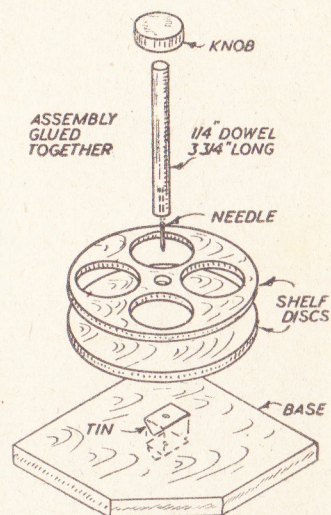


Fig. 5—The shelf assembly

brad the top to the sides and the main assembly is complete. Add the selector knob and a small piece of $\frac{1}{8}$ in. ply across the bottom of the open face of the cabinet, bradding to the base. The height of this piece— $\frac{1}{2}$ in.—should be such that it will just clear the bottom of the rotating shelf which protrudes slightly through the cabinet opening.

Finally round off all corners of the assembly and stain and finish to taste. Mark off the selector knob in the appropriate colours or code letters, and the job is complete.

(390)



Do you make Model Galleons?

From time to time we have published in these pages pattern sheets for all the most popular ships of history—'Santa Maria', 'H.M.S. Bounty', 'Ark Royal', 'Cutty Sark', etc.—and kits were provided so attractive models could be made. Readers may be interested to know all these designs and kits are still available from our Hobbies Branch, or an illustrated leaflet of them can be obtained free on request to Hobbies Ltd., Dereham, Norfolk.

A correct and simple way of forming STENCIL LETTERS

CORRECTLY proportioned lettering is often one of the most difficult things for the amateur craftsman to achieve. The 'straight-line' letters—E, F, L, T and so on—are generally easy enough, but 'W' and 'M' tend to complicate the issue. And when it comes to curved letters, commonsense proportions seldom work out satisfactorily. The letter 'S' and the figures '3', '5' and '8' are particular offenders in this respect.

The answer is that you must have a planned alphabet to follow. A style of lettering and numerals which are correctly proportioned, both individually and with respect to one another. Preferably, too, this alphabet should be capable of simple construction, using

only straight lines and circular arcs to complete all the letter forms.

The simple styling chosen does exactly this and construction has been reduced to the simplest form possible. To assist in spacing, all letters are made the same width—with the exception of 'l' and 's' and all layout dimensions related to the height of the lettering.

The thickness of all the strokes is also uniform— $\frac{1}{8}$ th of the height—and spacing between adjacent letters should also be made $\frac{1}{8}$ th of the height. You can, therefore, plan out the exact length of lettering and adjust proportions accordingly, remembering that certain letter combinations, e.g. AV, WA will have a slightly less overall width than purely block letters adjacent to one another.

All the letters and numerals shown are compounded purely of straight lines and circular arcs and construction of each should be perfectly clear from the diagram. There are no 'tricky' letters. 'S', the most difficult of them all, is made up simply of four intersecting arcs, the overall width of the letter 'S' being reduced somewhat to make it conform in styling to the remainder of the alphabet. The appearance of each one of the letters is clear and attractive.

For straightforward lettering, whether it be a house name or number, or a simple notice, the outline is constructed in pencil. Preferably, then, the outline should be ruled in with a ruling pen and ink compasses in the paint in which the lettering is to be made. The paint should be thinned down well to make it flow freely. For such lettering cellulose paint or 'dope' is highly recommended. Once the outline has been completed the letters themselves can be blocked in with a small brush, working right up to the original outlines. This avoids the somewhat ragged edge common with hand painting to pencil guide lines.

Alternatively, of course, stencils may be prepared of individual letters and used either with brush painting or spray. Care is needed when using stencils to hold them in place absolutely flat against the surface to be painted, otherwise colour will tend to 'creep' under the stencil and spoil the outline.

Made from some reasonably stout semi-flexible material, it is a good plan to stick stencils in place, if extreme accuracy of finish is required. This means cutting the actual width of the stencils down to the barest minimum so that the stencils themselves may be closely spaced to form the complete wording.

The other plan is to draw out the complete lettering on to a piece of stout drawing paper and cut the stencil from this, using it only once rather than construct a complete set of stencil letters for repeated use. Making a complete stencil takes very little more time than drawing on the outline lettering on the work itself.

Once the stencil lettering has been drawn out on paper, the letters should be cut out with a razor blade or sharp modelling knife, leaving a number of bridges where required to hold centre portions of the letters in place. For temporary attachment to the work, rubber gum is strongly recommended. This should be smoothed over the back of the stencil, when the whole can be pressed and stuck in place. Excess gum can be rubbed off.

After spraying or painting, the stencil should be removed before the paint has properly dried, otherwise it may tend to pull up the edges of the lettering. Rubber gum remaining on the work can then be rubbed off clean when the work has finally dried.



A few 'bits and pieces' can form a novel TABLE SKITTLE GAME

HERE is a good table game that can be made up simply and cheaply from a few pieces of odd wood.

As illustrated in the sketch, it consists of a pole or standard, to the top of which is hung a cord with a wooden ball attached. The pole is supported by a firm base consisting of two pieces of flat wood which are made to fit into each other crossways, being held in the middle by the pole which passes through each piece.

At the extreme ends of these base strips there are hinged the cut-out figures, so arranged that by the swing of the ball they collapse on contact with it.

The Game

It will be found very difficult to knock down more than two of the figures with one swing of the ball, but with care and practise, it should be possible to lay all four figures flat with one 'shot'. It is purely a matter of constant practise, and judging each swing and noticing the distance the ball comes each time in relation to the figures.

There is thus a certain amount of skill required in the game, and it should, therefore, create much amusement amongst a crowd of players.

At Fig. 1 in the diagram we show exactly how the base is made, and further explanation is hardly necessary. It will be noted, too, from this diagram, how the pole and base are easily taken apart for storing compactly in a long shallow box. Wood $\frac{1}{4}$ in. thick should be sufficient for the strips of the base and for their cross pieces at the ends and each side of the pole.

If the pole is made more than 15 ins. long, then it would be necessary to use a heavier wood, say, $\frac{3}{4}$ in. or even $1\frac{1}{2}$ in. thick for the base strips, etc.

Cross Strips

Piece (A) in Fig. 1 has two cross strips which hold the piece (B) centrally in place until the pole is inserted, when the base will be found to be quite rigid for playing.

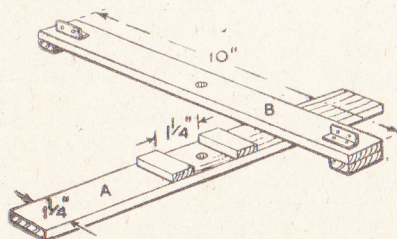
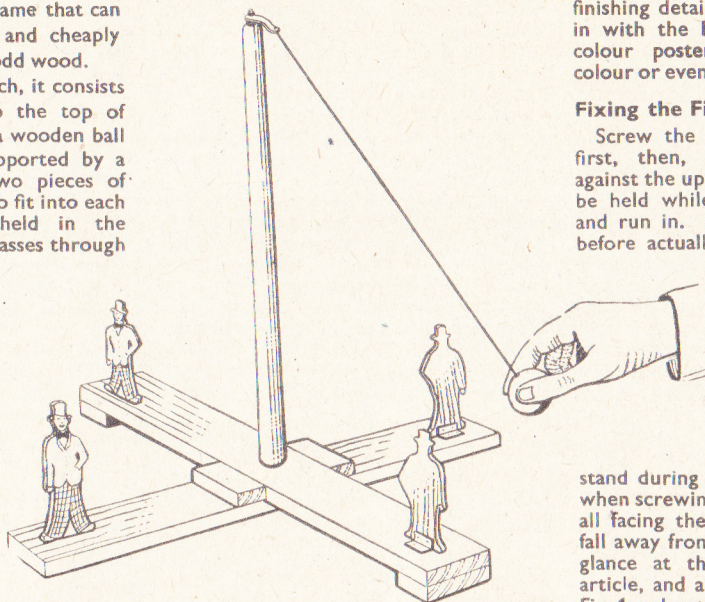


Fig. 1—Base board frame



The enlarged diagram, Fig. 2, shows how the cut-out figures are held upright by the hinges.

The diagram, Fig. 3, shows the swivel arrangement for the top of the pole. A piece of stout brass about $1\frac{1}{2}$ ins. long is bent up, as shown, and a hole drilled at both ends. A thin wire nail about $\frac{3}{4}$ in. long is then inserted in the end of the pole with the bent metal strip running smoothly on it between two glass beads which have in turn been threaded on the nail. The beads afford perfectly smooth running and allow the brass strip to swing easily when the cord and ball are attached.

The Figures

It only remains now to make the four cut-out figures. Each figure measures 5 ins. high by $2\frac{1}{2}$ ins. wide, and on a piece of paper this size, rule off the half inches, as shown at Fig. 4. Through the squares draw the outline and the interior work and finally thicken up the outline and rub out the lines of the squares.

The figure can now be transferred to the four pieces of wood, $\frac{1}{4}$ in. or $\frac{3}{16}$ in. thick, by means of carbon paper and a sharp pointed pencil. The outline should be cut round with a fine fretsaw and the edges cleaned with glasspaper. The

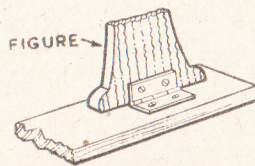


Fig. 2—Hinging

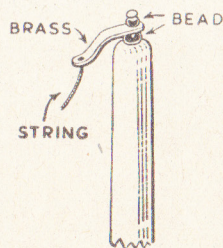


Fig. 3—Pillar top



Fig. 4—Figure shape

finishing details of the figure can be put in with the brush, using either water colour poster paint, ordinary water colour or even oil paint or enamel.

Fixing the Figures

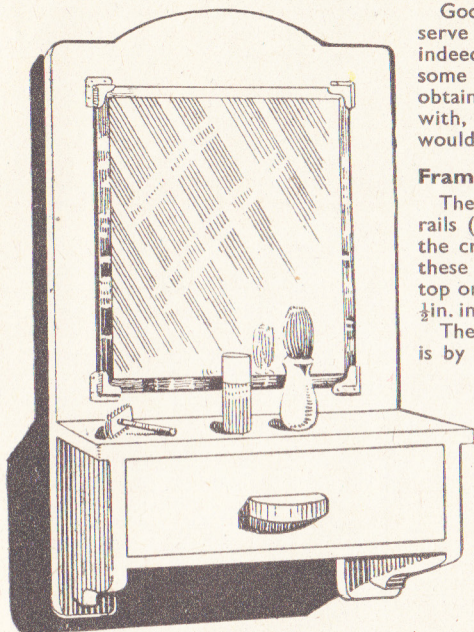
Screw the hinges to the base strips first, then, by standing the figures against the upturned flap, the former can be held while the screws are inserted and run in. It should be remembered, before actually screwing the figures to hinges, to slightly chamfer the extreme flat lower edge of each, so that they lean ever so slightly forward.

By doing this the figures will remain upright in spite of any joggling or unexpected movement of the whole stand during play. Care must be taken when screwing on the hinges to get them all facing the right way, so the figures fall away from each other as it were. A glance at the sketch of the finished article, and also at the pair of hinges in Fig. 1 makes this all clear.

A good finish for the base would be two coats of enamel or oil paint, while the pole could be simply varnished over. For the pole a length of dowel rod $\frac{3}{8}$ in. or $\frac{1}{2}$ in. diameter and from 12 ins. to 15 ins. long is best. This should be tapered gently towards the top, as shown, and rounded off and made smooth where the bead rests. Make the pole quite smooth with fine glasspaper before adding the varnish.

Designs are given free
with every other issue
but not with back num-
bers of Hobbies

Useful shelf and drawer fitted to this modern SHAVING MIRROR



WE give a sketch here of a very useful modern type of bathroom fitment. In addition to a good mirror of useable proportions, it has a handy little drawer for keeping shaving utensils in, instead of having them lying about. The home craftsman should be able to make a good job in the making of the fitment, as it is of simple and easy construction, and when painted or enamelled white or cream, should make a handsome addition to the bathroom or the bedroom, come to that.

The Back

In Fig. 1 we see the main back frame of the article with all the necessary measurements for the spacing of the rails, etc. Fig. 2 shows a side view, giving the shape of the side brackets supporting the shelf and drawer.

Just the ordinary set of household tools, including, of course, the most useful fretwork handframe, will be found adequate for the make-up of the frame and its drawer.

CUTTING LIST

A	2	16ins.	by	1ins.	by	1in.
B	1	10ins.	by	1ins.	by	1in.
C	1	10ins.	by	1ins.	by	1in.
D	1	10ins.	by	2ins.	by	1in.
E	2	4ins.	by	4ins.	by	1in.
F	1	8ins.	by	4ins.	by	1in.
G	1	10ins.	by	4ins.	by	1in.
H	2	8ins.	by	2ins.	by	1in.
I	2	3ins.	by	2ins.	by	1in.
J	1	8ins.	by	3ins.	by	1in.
K	1	8ins.	by	2ins.	by	1in.
L	1	2ins.	by	1in.	by	1in.

Good straight grained deal would serve to make up the frame, and, indeed, all parts of the fitment, but if some higher quality wood could be obtained, then a better fitting frame with, perhaps, a smoother surface, would result.

Framework

The frame consists of two upright rails (A), which are tied together with the cross rails (B), (C) and (D), and all these rails, with the exception of the top one (D), are 1 1/2 ins. wide, and all are 1/2 in. in thickness.

The method of connecting up the rails is by the halving joint, shown in detail in Fig. 3. This joint is very simple to make but it forms a very strong holding when properly made and glued up and screwed. A small-tooth tenon saw will be found most useful for cutting down across the grain preliminary to disposing of the unwanted wood.

The top or pediment rail (D) is shown shaped to give character above the mirror, the arc of the curve being struck from a point 5 ins. down from the top edge of the 2 1/2 ins. wide rail, and central, of course. Set out the tenons and their mortises carefully with the square, marking in good pencil line ready for the saw.

A 1/4 in. chisel will be found very helpful for cleaning out the wood between the cross cuts.

The curve on rail (D) will be cut, of course, with the fretsaw.

The side view, Fig. 2, shows the end grain of the halvings of the cross rails.

When the frame has been put together it should be levelled and glass-papered up smooth. The two brackets (E) are next made and each measures

4 1/2 ins. by 4 ins. The simple shaping at the bottom of the pieces can be gauged from the measurements given in Fig. 2. Clean up the cut edge with glasspaper but do not round off the edges or a neat effect will be lost.

Shelf

The rail (F) will next be marked out and cut, and as there are two methods of fixing it to the brackets, a choice must be made before actually cutting the length of the shelf. It may just butt simply against the brackets and be screwed to them with countersunk screws, or the ends may be housed about 3/8 in. into grooves made in the brackets.

The length, therefore, of the shelf will be made 3/8 in. longer in the latter case to allow for this housing process. The length will be 8 1/2 ins. in the one case and 8 3/4 ins. in the case of the housings. The lower extremity of each bracket will be set up 3/8 in. from the tail of rail (A), and they will be set in from the outer edge of them 3/8 in. Glue the brackets firmly to the uprights and run in some countersunk brass screws from the back of the frame.

Now fit in the shelf (F) and put in some screws through rail (C) into the back edge. The top (G) of the box is another plain square-cut piece 10 ins. by 4 ins., the side and front edges being neatly rounded over and glasspapered up smooth. It is glued to rail (C), and screws are put through from the back. A screw can also be added each end of the top to go into the top of the bracket.

The Drawer

The construction of this is simple and is easily explained in the detail Fig. 4.

The inner front and the back of the drawer is 3/8 in. thick, while the outer front (K) might be 1/2 in. thick and glued and screwed to the inner front, the screws being of such length that their

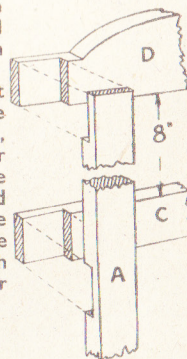


Fig. 3—Rail joints

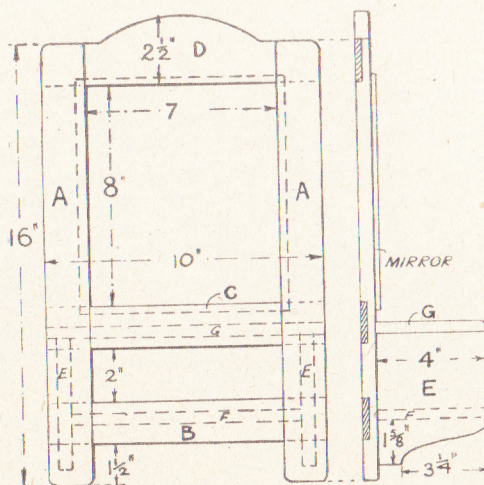


Fig. 1—The back frame

Fig. 2—Side view

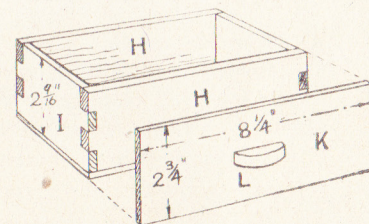


Fig. 4—Drawer construction

How to convert balsa into suitable SMALL TABLE MATS

BALSA wood is an excellent insulating material, readily obtainable and very easy to work. It is excellent for table mats, but suffers from the defect that the wood is so soft that edges are readily dented and spoiled.

The design shown utilises balsa mats edged with laminated hardwood strips. This not only serves the purpose of protecting the edges but adds a pleasing decorative effect. Nor does the wood bending involved present any special difficulties.

Start by cutting the mats themselves

with hardwood stock. Three laminations of $\frac{1}{4}$ in. by $\frac{1}{16}$ in. hardwood are recommended, preferably birch or spruce for ease of bending. A very pleasing effect is given by making the middle strip of the three of contrasting colour—choosing a dark wood, for example, to go with two spruce strips. Alternatively, use three spruce strips and dye one beforehand with waterproof dye.

Three 30 in. lengths of $\frac{1}{4}$ in. by $\frac{1}{16}$ in. material will be adequate for each of the mat sizes shown. Again we would advise a waterproof cement rather than

strip on top, all three strips then being assembled one on top of the other on a convenient surface.

Cement and Pin

Then coat around the edge of the mat with cement and start by pinning the strips to the centre of one side, stepping them, as shown. A pin can be forced through $\frac{1}{4}$ in. by $\frac{1}{16}$ in. material without damage.

To bend the strips in place, simply work round from this initial point, forcing the strips around the curve. The strips will bend quite satisfactorily

without any other treatment unless cross-grained, when there may be a tendency to split. Force the strips right round the edge of the mat back to the starting point and make off each strip as a butt joint at its respective stepped position. Hold with another pin or a clamp, or just a rubber band around the mat.

At least twelve hours should be allowed for the cement to set when the mat can be handled again. Simply

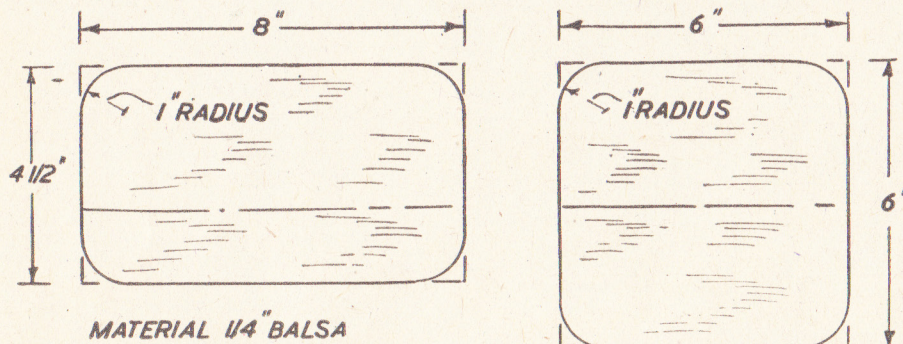


Fig. 1—Two suitable sizes

from $\frac{1}{4}$ in. balsa sheet. Two recommended sizes are shown. All corners are rounded off with a 1 in. radius. Usually balsa is obtainable in widths of 3 ins. Thus to get the full width required two pieces must be joined together. An ordinary butt joint is quite adequate, using balsa cement. This will give a strong waterproof joint—stronger, in fact, than the wood itself if carefully made.

Drying time with balsa cement is only a matter of minutes.

Having completed a set of balsa mats in this way, each must now be edged

normal glue. The type of slow-drying balsa cement is excellent. Coat all along one strip, lay the second strip on this, add more cement and lay the third

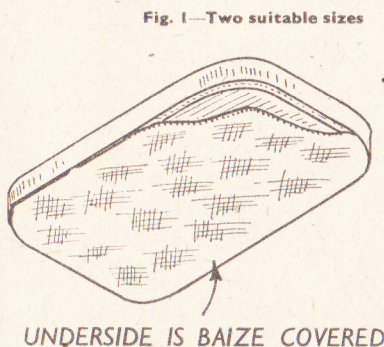


Fig. 3—The covered underside

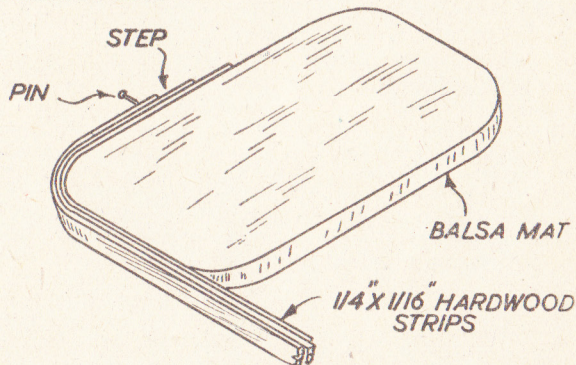


Fig. 4—Edging strips

glasspaper down smooth and treat the edges with stain or polish, as desired. Balsa will not take a satisfactory polish or respond to stain evenly unless previously treated with grain filler. Actually it will not suffer if left untreated, and if good clean wood was chosen initially, it will look quite attractive plain.

Undermat

The final stage is to cement or glue a strip of baize or similar material to the underside of each mat to provide a non-scratch surface. A suitable stand can then be made out of ply to hold the complete set which, besides being as attractive as most on the market, will, probably, be more effective as heat insulators. (389)

Your Letters are Welcome

WE are always glad to answer letters of readers, to solve their problems and to offer suggestions, but readers should remember to add their full name and address or include a stamped addressed envelope, as it may be impossible to print their replies in these pages in our usual 'Replies of Interest' section. Letters should be clearly written and explain fully the nature of the query.

Housewives will be delighted if you make them SOME WASHDAY GADGETS

THERE are many little gadgets that can be made and ideas adopted in order to make the work of wash day so much easier.

Probably the greatest nuisance is the everlasting dirty linen line. Smuts from nearby chimneys fall on the line and then rain comes and washes it all in, making a nasty mess which cannot be properly cleaned. If the line is made to take in after use, this would not happen.

length of rope connected to the line loop by means of a toggle, which is a short piece of dowel rod having a groove cut round its centre. It, therefore, takes only a matter of seconds to unhook and take in the line after use.

Another way with dirty lines is to hang the clothes so that they do not touch the line at all. Clothes pegs fitted with a clip, as shown in Fig. 2, is the easy solution to this problem.

Cut a strip of springy brass or alu-

end of the peg and, therefore, there is no need for them to ever touch the line and get dirty marks on them.

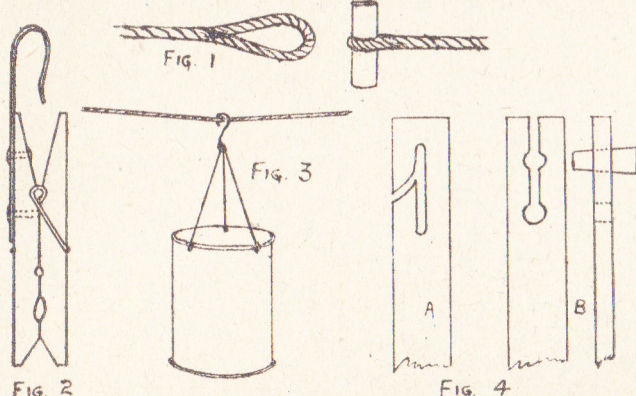
Another very useful gadget is a container for the clothes pegs that is always near and handy for pegging out. It is awkward to hold a handful of clothes and sufficient pegs to hang them with, but with the aid of a container, such as that illustrated in Fig. 3, which can be hung on the line near at hand, the job is made easy. It can be made from a tin or small wooden box suspended with three wires and a hook to slip over the line.

Prop Fitting

The prop can sometimes be a nuisance, especially on a windy day, on account of the 'V' at the top not being deep enough to hold the line securely. By using a carefully designed prop this difficulty can be overcome and Fig. 4 shows two such improvements.

Although (A) is very simple and does not look satisfactory, it will be found that the line enters easily, but is much more difficult to get out again, especially if the inlet curve is kept just wide enough for the line.

The second prop (B) is made by first drilling two holes and then cutting the slot just a little narrower than the holes. A plug is made to fit in the top hole and is inserted after the line is in position, thus making it quite impossible to come out, however strong the wind. (355)



The best method to adopt here is to make a loop in each end of the line proper, as shown in Fig. 1, the line being only long enough to go between the posts. On each end is fastened a short

minium $3\frac{1}{2}$ ins. long and $\frac{3}{8}$ in. wide and fasten on to one side of the peg with two rivets. Bend the top over to form a springy hook to fit the linen line.

The clothes are gripped in the lower

Overhaul your Cycle

NOW comes the time to start thinking of the days ahead when cycle touring at week-ends and holiday periods will be possible again. This form of pastime is one of the most carefree, economical, enjoyable and health-giving ways of spending leisure hours and holidays. Thousands have discovered this fact, and each year more thousands join the great brotherhood of the road.

To newcomers one would say that, to ensure the greatest pleasure from cycle touring much depends upon your 'steed'. Remember, a machine that may be quite suitable for everyday riding around home or to and from business, is not necessarily a satisfactory mount for a long-distance run, when you have to carry a certain amount of luggage.

The essentials of a touring machine are briefly: Comfort; reliability; suitable gearing; bearings that run freely but without shake; and a chain that provides a smooth silent drive. All these attributes are to be found in any well-known manufacturer's products, and it only requires careful thought and common-sense in selecting a good type

of standard tourer. Above all, it must be in faultless mechanical condition before you set off on any sizable tour.

Obtain a machine that is light and rigid; an all-steel, sturdily built lightweight with variable gear, and a comfortable saddle fits the requirements of the tourist. Some cyclists still remain faithful to the fixed gear, and this has certain advantages for riding to and from business in a town or city; but for touring where you may have to face stiff gradients, hill-climbs, and often meet head winds at times, the variable gear is a great boon.

When mentioning 'lightweight' machines one refers to those types having a small rigid frame and light wheels, fitted with flat or upturned handlebars, a comfy saddle, tyres of a medium width, and a variable gear, and not to the 'racing' 'lightweight' with dropped handlebars, a hard, unyielding saddle, and a fixed gear. There is all the difference between them, although designed somewhat on similar lines.

Remember, too, in selecting a mount, to take into consideration your height and weight. Do not buy a machine without first inspecting it thoroughly,

and sitting on it. Unless you can reach the ground with the forepart of both feet, the machine is too big for you, and therefore undesirable.

Your Old Machine

Perhaps you already possess a good machine that has served you well, and is good enough for another season, but looks a trifle shabby. As we all need to be very economical in these days, it is worth thinking about. By all means renovate the machine.

Look well to the bearings and make sure they are not badly worn. The brakes, too, must be carefully inspected and readjusted. The wheel-chain should be examined, and if necessary replaced with a new one; otherwise correctly adjust it for tension, so that there is no visible 'sag' when the machine is at rest.

You can well give the machine a 'new look' by enamelling it with a good lacquer, first scraping off any old enamel that is in a bad condition; if you have a blow-lamp and know how to use it, careful heating with a soft flame will help to get the old enamel off, then scour smooth with emery cloth, and wash

(Continued foot of page 378)

How the handyman can easily make A LAMPSHADE FOR 1/-

AS most readers know, the average lampshade has a limited life, heat from the lamp and household dust, both playing a part in its ultimate deterioration. When a new shade does become necessary, it can be a simple and most inexpensive business to provide a new one. The wire frame is not included in the total cost above, as this is almost everlasting.

For making the shade above, one sheet of white cartridge paper is required, price about 5d., with 2yds. of narrow braid, 4d., and about 3d. of castor oil. With these materials to hand, work on making the shade can commence. It is a pleasant job, just the thing to fill in the evening, with something worthwhile to show for your labour.

Shade Pattern

A pattern for the shade must be drawn out first. This is shown at Fig. 1. On a sheet of paper, draw line (A), the small diameter of the shade, below this line (B), the large diameter, both lines being separated by a distance equal to the depth of the shade. Connect these lines at each end, then extend them until they meet at the centre line.

At this point press in a drawing pin or stout domestic pin. Wind a length of string round the pin and tie. Then extend the string to one end of line (A) and tie a pencil to it. Hold the pencil vertical and swing it to the opposite end of the line, leaving a curve, as shown.

Repeat this on line (B) below. To get a satisfactory and firm curve, it is necessary for the string to be drawn quite taut and the pencil held truly upright. A long strip of wood can be used in place of the string, if preferred, with a hole through the top end to drop over the pin, and two holes lower down, at the required distance, to reach lines (A) and (B), for the point of the pencil to enter. The latter method is really the best.

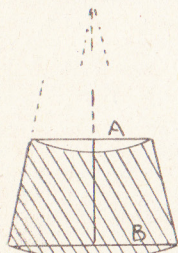


Fig. 1—Shape pattern

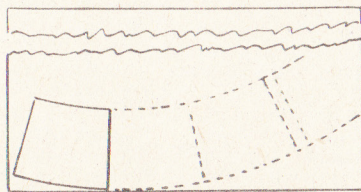


Fig. 2—Repetition work

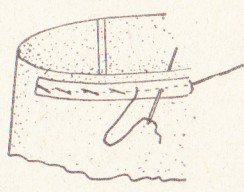
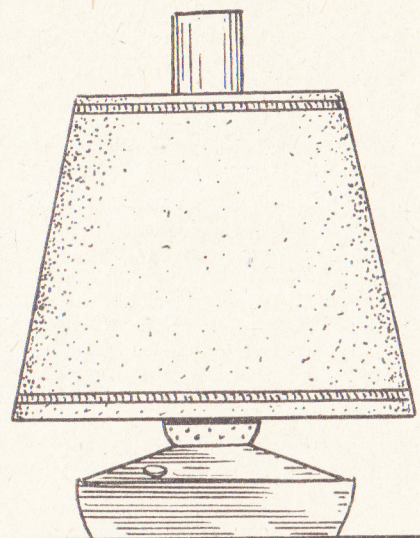


Fig. 3—Stitching



The complete pattern, shown shaded in the diagram, is now cut carefully out. On a flat table spread out the cartridge paper, and on it, at about the spot shown in Fig. 2, lay the pattern and lightly pencil round it to the paper.

Remove the pattern, and lay it against that already drawn and repeat, about $3\frac{1}{2}$ times will be enough, as shown by the dotted outlines. The actual length of paper will be about $3\frac{1}{2}$ times the pattern, but allow a little more.

Shaping

If the sheet of paper is not large enough to lay out the full pattern, then it must be divided, but that need present no difficulty. Now cut out the complete pattern and bend it round the wire frame of the shade, letting it come down below the wire about $\frac{1}{2}$ in. Pencil mark here, allow $\frac{1}{4}$ in. for joining the edges together, and cut away the surplus. Join the ends together with a strong cement

or liquid glue, and press down to ensure complete adhesion.

Lay a sheet or two of common newspaper on the table and place the shade upon it. Press down at the centre, but avoid the curved sides, as these must not on any account be creased, or the shape of the whole will be damaged. Provide a clean piece of white rag, drop the castor oil on the paper shade and rub well all over. Do a piece at a time until the whole outer surface has been treated, then repeat the treatment on the inside of the shade.

Assembly

Now leave it to dry, which will take but a short while. This process leaves the paper translucent, just the right condition for a lampshade.

Place the shade over the frame, and fix it there with three or four stitches of thread, evenly spaced round the ring. Now, with a strong thread ready, place the narrow braid on the shade, just over the wire ring of the frame inside, and there stitch through and round the wire. Stitches about $\frac{1}{2}$ in. long will serve, and the job should be neatly done. For the top of the shade, the braid can be just stitched round and will probably keep the shade circular without anything else.

It will be helpful, however, should the reader have in his possession a few feet of thin iron wire, to sandwich the wire between the braid and the lampshade, as in detail sketch, Fig. 3, and to stitch through, with the stitches crossing the wire during the process to keep it in place.

This does ensure a firmer shape. If not quite satisfactory a little manipulation with the fingers will improve the curve, but it usually happens that the wire assumes a reasonably correct circle during the stitching operation, owing, probably, to the bending it receives from the fingers.

This completes the shade, and the effect when the light shines through is most pleasing, a pearly glow resulting, restful to the eyes. Take care of the pattern, then when a new shade is wanted, it can be used again. Though the drawings for this article are designed mainly for a shade to suit a lamp of the 'Aladdin' type, it is quite easy to amend them, as may be necessary, to suit the electric current as well. (367)

Cycle Overhaul—(Continued from page 377)

clean with petrol. Give one coat of enamel, leave to dry hard, and give another coat, and afterwards, if you like, give the whole a thin coat of 'finish'. After the job is done, and has hardened thoroughly, wash down with cold water, using a window leather, before taking out the machine again.

During a complete renovation, strip the cycle as much as you can—chain, wheels, brakes, handlebars, etc.—and wash out all bearings, and chain with paraffin, drying off all surplus. When re-assembling the parts be sure to get everything carefully in position and correctly adjusted; you cannot be too

particular about this, as so much depend upon it. Worn tyres should be replaced with new. Test brakes by applying them hard, and then trying to push the machine along; this will be impossible if the brakes have been properly adjusted and rendered efficient. (360)

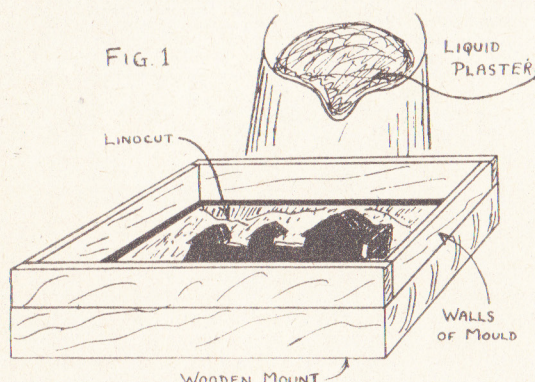
Simple instructions for making plaster PLAQUES FROM LINO-CUTS

HERE is a novel method of making wall-plaques, either for yourself, as gifts, or for sale. Your mould is fashioned from an ordinary lino-cut and the plaque, itself, is cast from plaster of Paris or a similar medium.

A suitably sized piece of lino for quite a large mould should cost you no more than a few pence. Do not use ordinary household linoleum, unless you can lay your hands on some of exceptionally good quality. For our purpose it is best to obtain thick brown lino from an art-stockists. This has been expressly manufactured for the purpose of lino-cutting. A stout piece of this linoleum will provide you with a mould capable of reproducing scores of plaques. The additional outlay of a few pence will be well worthwhile, you see.

background untouched. When a cast is taken the pattern will then be standing in relief above the background.

The technique involved in cutting your mould is similar to that employed for making an ordinary lino-cut. The usual lino-cutters and gouges are used. For the purpose of a mould, however, it is necessary to eliminate all rough gouge marks where the lino has been removed. A certain amount of glasspapering can be done to the surface of the finished cast, but you will find that time spent in making the mould as smooth as possible will be really time saved, especially if you propose casting dozens of these plaques.



Decide on the size and external shape of your plaque and cut the piece of lino to shape, accordingly. The plaque may be square, rectangular, hexagonal, circular, etc. Make the edges as clean and sharp as you possibly can, using fine glasspaper to finish off with, if necessary.

Choosing the Design

Now you must choose a suitable design. Do not be too ambitious to begin with. A simple motif, devoid of intricate detail, is far better to commence with until you have mastered the reasonably simple technique which is necessary.

If you are not a good artist (and how many of us really are!) trace any suitable pattern or design and transfer this outline to the surface of the lino. If ordinary pencil marks do not show up plainly enough, give the lino a brushing of white poster paint, allow to dry, and then draw on this.

A Decision

You must decide whether you wish the pattern, when cast in plaster, to appear in relief or below the surface of the finished plaque. For most purposes you will probably find it best to cut against the actual design and leave the

When satisfied with your lino-mould it should be glued to a smooth slab of wood that is 1 in. or so larger all round than the external dimensions of the lino. Place under pressure until the glue has dried.

Now to build the walls of the mould. If your plaque is to have straight sides you will find that this can most effectively be accomplished by planing up strips of wood and tacking these into position, as shown in Fig. 1. The larger your plaque is the thicker should be the finished cast.

You can regulate this thickness by making the walls of the mould the necessary depth before securing them to the wooden block.

WIRE HANGER TO BE SUBMERGED
IN THE WET PLASTER



FIG. 2

**Tell your friends
they can now get
copies of Hobbies
from any newsagent**

If the plaque is to have circular sides you will find it best to either bend a strip of thin metal or stout cardboard to form the walls of the mould or else build a bank of modelling clay round the outer edge of the lino-cut.

Dust the inside of the mould, to ensure its perfect freedom from scraps of lino, and then brush it over with a thin film of oil to make it easier to withdraw the completed cast.

The Cast

The actual cast can be made in plaster of Paris, dental plaster, or one of the proprietary brands of modelling media which simulate the effect of marble when hardened off. Plaster of Paris is as good as anything for your first few trial casts. It should be mixed with water to the consistency of thick cream and then gently poured into the mould.

This form of plaster will set reasonably hard within ten or fifteen minutes. Before it has quite hardened off it is a good plan to push a small wire hanger into the back of the plaque (see Fig. 2). This will obviate the need for any messy fiddling, afterwards. Upright the mould, shake the cast carefully free from the lino-cut, and then put aside in a warm dry spot to harden off completely.

Finishing the Plaque

Smooth the face of the plaque with fine glasspaper wherever necessary. Some may prefer the plaque in this natural state, others will wish to paint the completed work. A coating of size should be applied to the plaster to seal the pores, and then poster paints or art enamels, etc., may be used for the finishing touches. Clear varnish will impart a nice glossy surface if water colours are employed. (397)

Here is the proper way to construct A FERRET HUTCH

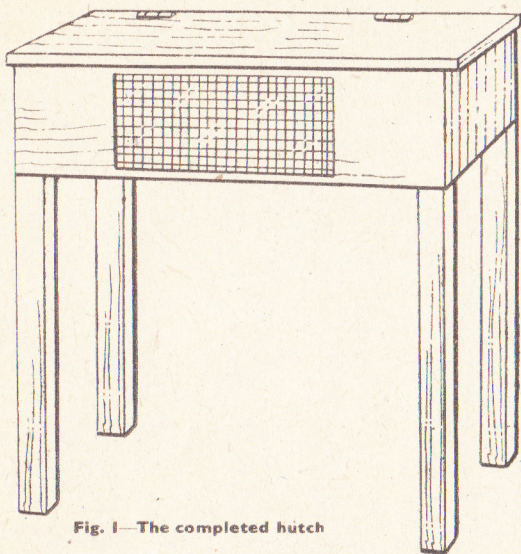


Fig. 1—The completed hutch

A SIMPLE ferret hutch, which has plenty of room in which the animals can exercise, can be made from ordinary $\frac{1}{2}$ in. board. It stands on four legs, and has separate compartments which will tend to keep the ferrets tidy and clean in their habits.

Lay-out of the Hutch

The complete hutch is divided into three compartments, the normal living-space, the sleeping quarters, and a small piece with, for the most part, a wire floor, which serves as the animals' closet.

The width of the hutch is 4ft., the length from front to back $1\frac{1}{2}$ ft., and the height 1ft. An area covering the whole of the height of the front, except for 1in. at top and bottom, should be sawn out to leave 1ft. still enclosed at either end of the hutch. In this is nailed a piece of wire netting which then covers the front of the living quarters (see Fig. 1).

The Interior

The interior is then divided into three by fastening into position two struts inside which run from front to back at the point where the wire adjoins the wood. They are not completely rectangular pieces, as a

rear edge of the hutch.

The Separate Quarters

The compartment on the one end is the animals' closet. It should have most of its floor space sawn out, and a piece of wire netting nailed in its place. It must be kept bare so that they will see the difference between it and the other two compartments.

The living room, in the middle, may have a sprinkling of straw on the floor; and food should be put in this space at feeding-time. The space at the other end, which is the 'bedroom', should have a good bed of wood shavings.

It is essential that the whole hutch should be kept clean at all times, with particular attention to the closet. This must be swilled with water every day, and the contents washed out through the wire netting (see Fig. 3).

Mount It On Legs

When the hutch is complete mount it

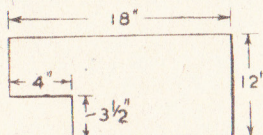


Fig. 2—Division pieces

small hole is sawn away to allow the animals access from one compartment to another (see Fig. 2). When the interior is complete in this respect, construct the roof so that it overlaps the whole by 1in. all the way round. Cover it with a piece of waterproofed tarpaulin so that the rain runs off, and hinge it to the top

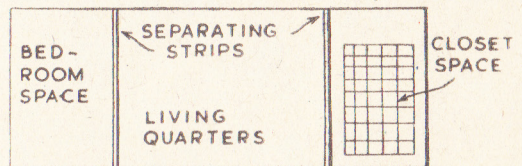


Fig. 3—Plan of the compartments

on legs about 5ft. tall. This will enable it to be cleaned easily without stooping. It should be kept in a position where there is no draught, as ferrets are prone to many minor ailments. The normal diet is bread and milk, with a rat or some rabbit flesh twice a week. (343)

Shaving Mirror—(Continued from page 375)

points will not project through the front. The pieces (H) and the ends (I) are lock-jointed together, as shown, this type of joint if properly cut and fitted, being excellent for any such drawer construction.

The floor, shown as (J) measures 8 $\frac{1}{2}$ ins. by 3 $\frac{1}{2}$ ins. and may consist of a

piece of $\frac{3}{8}$ in. plywood. It is pinned or screwed direct to the edges of pieces (H) and (I). Note in the drawer diagram that the main front (K) comes down and hides the front edge of the floor. It may be of help to the worker to say that when cutting the projections of the lock joints, to always cut along on the

outside of the lines so that when the joint is glued and knocked together, a firm and perfectly rigid joint is assured.

Again, before attaching the front (K), thoroughly glass-paper the front (H) the floor edge and make a good level surface before gluing on the front. A simple

handle can be shaped up with the fret-saw and the edges well glasspapered to make for safe handling.

The Mirror

A bevelled edge mirror measuring 8 $\frac{1}{2}$ ins. by 7 $\frac{1}{2}$ ins. would be ideal to suit the size frame shown. If a bevelled mirror cannot be obtained then a plain piece would serve the purpose, the sharp edges being rubbed down with a grit stone or carborundum slip dipped in oil. Specially made chromium-plated clips can be bought for fixing the mirrors and these are screwed to the framing after the mirror has been put accurately in place. Two or more brass or chromium-plated hanging plates are screwed to the back of the frame for fixing to the wall, rawlplugs being let into the walls for the screws.

The cutting list of wood required for this Bathroom fitment as given here will be found very useful when draughting out and cutting the several pieces.



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Heat a little in a dry tube. It chars and gives a smell resembling burnt sugar. The charring indicates it contains combined carbon, and hence is an organic compound. Pour dilute hydrochloric acid on to the residue in the tube. It will effervesce, and if you pass the evolved gas into lime water it will turn it milky. This indicates a carbonate has been formed. We can use this reaction to make pure potassium carbonate.

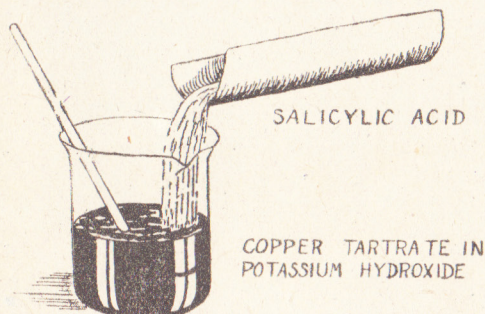


Fig. 1—Making a rare compound

Half fill a crucible with cream of tartar and heat until the action has ceased. Stir up the charred product with several lots of water until you have removed it all from the crucible. You now have a solution of potassium carbonate mixed with carbon. Filter the solution from the suspended carbon and evaporate to dryness.

No Crystals

Do not attempt to produce crystals, for this is difficult, owing to this salt being highly deliquescent. Scrape out as much as you can from the evaporating basin and keep the specimen in a tightly corked bottle. The small portion which is left adhering to the basin will soon show you how deliquescent potassium carbonate is. Leave it aside while you carry on with the other experiments. When you return to it you will find the dry solid has become an oily liquid.

Cream of tartar, being a tartrate, gives us the means of preparing other tartrates. As most of these are insoluble in water we can prepare them by precipitating them from solutions. But as cream of tartar is only slightly soluble in cold water (one part in two hundred of water) this means we must either use large quantities of cold solution or else use a

boiling solution (solubility at the boiling point, one part in fifteen).

We can avoid these inconveniences by converting it into Rochelle salt which is very soluble in water, and only differs from cream of tartar in being potassium sodium tartrate instead of potassium hydrogen tartrate.

Washing Soda

Make a solution of sodium carbonate (washing soda) in boiling water and add solid cream of tartar to it in small portions. It will effervesce and give off carbon dioxide. Let each portion dissolve before adding more, removing a drop each time with a clean glass rod and testing it with red litmus paper.

When only a faint blue colour is imparted to the litmus paper, the solution is neutral and the reaction complete. You now have your stock solution of Rochelle salt.



Fig. 2—Crystals on a porous tile

A characteristic tartrate—and one which is much used as a test for tartrates—is calcium tartrate. Take some of the Rochelle salt solution and add to it calcium chloride solution. A white crystalline precipitate of calcium tartrate falls, which you can filter off, wash on the filter and dry in a cool oven.

Natural Tartrate

If your solutions are dilute, the precipitate will not appear at once, but

Your Screwdriver

Next to a hammer, a screwdriver is probably the most used tool—and often gets the least thought or attention. But even the most haphazard among us find ourselves faced with a job of re-conditioning when, after using the screwdriver as a jemmy or a chisel, we find the shaft bent and the blade burred or notched.

Straightening the shaft is usually a simple enough job, but repairing the blade needs a little more care. First, use a fine file across the end so as to make a smooth, blunt edge. Then file parallel sides down each face. Take care not to form a sharp, chisel-like edge, as the blade will then be easily

after a few moments, and you can hasten it by scratching the sides of the vessel with a glass rod. Calcium tartrate occurs naturally in senna leaves.

Lead tartrate may be made in a similar way, using lead acetate instead of calcium chloride. This, too, is a white crystalline precipitate, which you can filter off, wash and dry for your chemical stock.

Copper tartrate is a pale greenish-blue powder, insoluble in water. To prepare it mix copper sulphate and Rochelle salt solutions, wash on the filter and dry it.

A Rare Compound

From copper tartrate we can prepare a rather rare and very beautiful compound. This is basic copper potassium salicylate. Make a strong solution of potassium hydroxide by dissolving this alkali in about twice its bulk of water. Dissolve in it enough copper tartrate to produce a deep blue solution.

Now take about five times the bulk of salicylic acid as you did of copper tartrate. Stir the acid into the solution. It will dissolve. Almost immediately a green precipitate forms which is the basic copper potassium salicylate. Let the solution stand half-an-hour, then decant off the clear liquor and pour the green precipitate on to a clean porous brick or tile to drain.

In an hour or so the compound will be left almost dry, as a brilliant green crystalline powder. To purify it, dissolve it in the smallest possible amount of warm water, and leave it to crystallise overnight. Remove and drain the crystals.

Finally, if you dissolve some of this in cold water and add barium chloride solution, a dull green precipitate of the rare compound basic copper barium salicylate forms, which you can wash on the filter and dry.

These last two compounds are rare not in the money sense, but in being seldom prepared. Indeed, most chemists never handle them in the whole of their scientific careers.

damaged again, and may also tend to slip out of the notches of the screws.

Glasspaper

Where a plane has not left the surface of the wood as smooth as one would have liked, it is usual to put the final finish on it with glasspaper. If the work is to be varnished or french-polished, remember to rub along the grain of the wood, as scratches left on the surface will show through.

For the best results it is advisable to use a block to hold the glasspaper absolutely flat. They can be purchased in different sizes, and are quite cheap. It saves time, too, to buy refills ready cut to fit the blocks.

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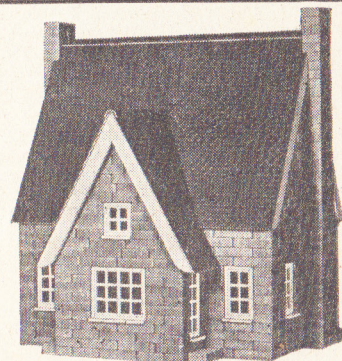
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(Continued foot of page 383)



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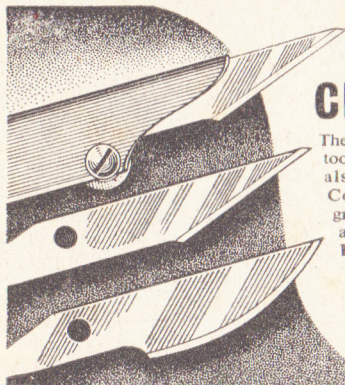
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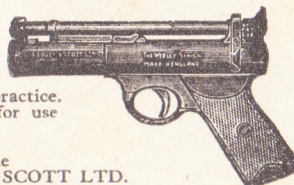
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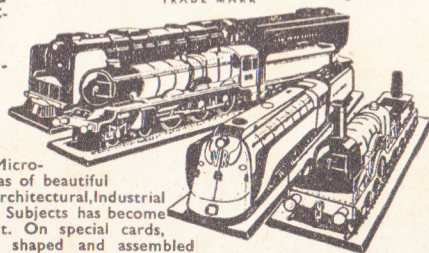
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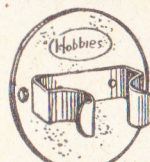
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